

State of Michigan



Training Manual

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Preface

Michigan Regulation 637, Pesticide Use, requires pesticide applicators who are applying pesticides (other than sanitizers, germicides, disinfectants, or anti-microbial agents) in schools, public buildings, and health care facilities to receive verifiable training in Integrated Pest Management (IPM).

The purpose of this self-study manual is to provide training in the IPM elements required by Regulation 637, specifically, Rule 14(a) (i)-(vii).

Because IPM training must be verifiable, you are asked to provide the Michigan Department of Agriculture (MDA), Pesticide and Plant Pest Management (PPPM) Division with confirmation of your completion of this training manual. This is done by completing the training verification form found at the back of the manual and returning it to MDA. Upon receipt of this form, your name will be recorded in a database of IPM trained applicators and you will be issued an acknowledgement of receipt.

It is imperative that your training efforts be documented and recorded by MDA. MDA training records will be used to verify compliance with Regulation 637 for applicators utilizing this self-study tool.

If you have any questions, please feel free to contact your nearest office of MDA.

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Introduction

Pesticides are used to protect food and non-food crops, pets, homes, and ourselves from pests. Public concern about health and environmental risks associated with the application of pesticides is increasing. In order to address this growing concern, pest managers and regulatory agencies are promoting the use of effective alternative pest control methods. Managers with in pest control decision-making responsibilities should become aware of the pest control options available to reduce exposure to potentially harmful pesticides.

Integrated Pest Management (IPM) is defined as a pest management system that utilizes all suitable techniques in a total pest management system with the intent of preventing pests from reaching unacceptable levels or to reduce an existing population to an acceptable level. An emphasis is placed on manipulation of the pest's environment to the point that it will not support a pest population.

IPM can also be defined as an effective and environmentally sound approach to pest management that relies on a combination of common sense practices. Its purpose is to manage pests with the least possible hazard to people, property, and the environment. IPM is a comprehensive approach to pest management.

Regulation No. 637, Pesticide Use, Rule 14, requires a pesticide applicator to participate in an IPM verifiable training program approved by MDA and that an IPM program must be in place for the building before any pesticide applications other than sanitizes, germicides, disinfectants, or antimicrobial agents, are made in schools, public buildings, and health care facilities.

Purpose of this Manual

MDA has prepared this manual:

- to provide information required by Regulation 637, Rule 14
- to aid persons applying pesticides in regulated institutions
- to comply with the IPM training requirement
- to guide the development of an IPM program

It is not the intention of this booklet to discuss prevention and control of specific structural pests, but to offer examples of IPM strategies.

A list of "Key terms" used in this manual has been prepared and may be found at the end of the manual.

Key Terms

Applicator: A person who applies pesticides by any method for any purpose at any place.

Building manager: A person who is designated as being responsible for the building's pest management program and to whom any reporting and notification shall be made.

Certified applicator: A person authorized under this act to use and supervise the use of a restricted use pesticide.

Commercial applicator: A person who is required to be a registered or certified applicator under this act, or who holds himself or herself out to the public as being in the business of applying pesticides. A commercial applicator does not include a person using a pesticide for a private agricultural purpose.

Commercial building: Any portion of a building that is not a private residence where business is located and that is frequented by the public.

Day - care center: A facility, other than a private residence, which receives one or more preschool or school-age children for care for periods of less than 24 hours a day, at which the parents or guardians are not immediately available to the child, and which is licensed as a child care organization by the Michigan department of Social services in accordance with Act No. 116 of Public Acts of 1973, as amended, being §722.111 et seq. of the Michigan Compiled Laws.

General use pesticide: A pesticide that is not classified as a restricted use pesticide and can be purchased without restriction.

Health care facility: A facility which is not a private home and at which people may stay one or more nights and receive medical care, such as a hospital or nursing home.

Integrated pest management: A pest management system that uses all suitable techniques in a total management system to prevent pests from reaching unacceptable levels or to reduce existing pest populations to acceptable levels.

Incidental use: The application of a general use pesticide as an accompanying minor occurrence to a primary work function.

Pest: An insect, rodent, nematode, fungus, weed, and other forms of terrestrial or aquatic plant or animal life or virus, bacteria, or other microorganism, or any other organism that the director declares to be a pest.

Pesticide: A substance or mixture of substances intended for preventing, destroying, repelling, or mitigating pests, or intended for use as a plant regulator, defoliant, or desiccant.

Public building: A building that is owned or operated by a federal, state, or local government, including public universities.

Ready-to-use pesticide: A pesticide that is applied directly from its original container consistent with label directions, such as an aerosol insecticide or rodenticide bait pack that does not require mixing or loading prior to application.

Re-entry interval: The time between the application of a pesticide and the time when people are allowed to return to the treated area without personal protective equipment. Liquid, spray, or aerosol insecticide applications shall not be made in any room of a school building unless the room will not be occupied by students for not less than four hours after the application unless the product label requires a longer re-entry period. The building manager shall be notified of the re-entry restrictions by the applicator.

Registered applicator: A person who is not a commercially certified applicator and who is one or more the following:

- Authorized to apply general and restricted use pesticides for a commercial purpose as provided in the act and in the rules promulgated under the act.
- Applies pesticides as a scheduled and required work assignment in the course of his or her employment on the property of another person for any purpose.
- Applies pesticide for a private agricultural purpose.

Notification Registry: A list of persons who require notification before a turf or ornamental pesticide is applied on a property that is adjacent to their primary property as described in Regulation 637, Pesticide Use, Rule 5.

Restricted use pesticide: A pesticide classified for restricted use by the EPA or the director.

Sensitive area: Any of the following:

- Occupied school buildings, together with any land that is part of the same property and is within 100 feet of such buildings, and includes any playgrounds, athletic fields, or other such facilities which are in the vicinity of school buildings and which are in use at the time of the pesticide application.
- Commercial preschool and daycare facilities that are located in buildings which are identified by signs or other means and which are recognizable to the public.
- Posted school bus stops which are identified by signs and which are recognizable to the public.

School: Public and private schools, grades kindergarten through the twelfth grade.

Use of a pesticide: The loading, mixing, applying, storing, transporting, and disposing of a pesticide.

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Michigan Requirements for Using Pesticides In and Around Schools, Health Care Facilities, and Public Buildings

State and federal law require pesticides to be used in accordance with their labeling. Strict adherence to label use requirements helps to ensure protection of the applicator and the environment. In addition to labeling requirements, pesticide applications made in schools, health care facilities, and public buildings must be made in accordance with specific requirements for posting and notification, reentry, and IPM. These requirements are found in Regulation 637 and highlighted here.

Regulation No. 637, Pesticide Use, Rule 14 **IPM training requires:**

1. Before any pesticide application is made in a public building, health care facility or school, a pesticide applicator shall have participated in a verifiable IPM training program that is approved by the director.
2. Before any pesticide application is made in a public building, health care facility or school, a verifiable IPM program shall be in place for the building.

Regulation No. 637, Pesticide Use, Rule 11 **Posting Requirements:**

Do you make an insecticide application to a:

1. Commercial or public building
2. Health care facility
3. Licensed day-care center
4. School

If so, you must provide a sign to be displayed at a primary entry point in the building by building manager.

The sign must:

1. Posted for not less than 48 hours
2. Be a minimum of 2 ½ inches by 2 ½ inches
3. Printed in black letters on muted background
4. Cloud symbol encompassing a house
5. Have space for date of application

Regulation No. 637, Pesticide Use, Rule 15 **Pesticide Use In and Around Schools**

All applications of insecticides, fungicides, and herbicides that are made in and around schools and day-care centers are covered by Rule 15.

1. A room in a school must be unoccupied for at least 4 hours (or more if required by product label) after a pesticide application is made. The building manager shall be notified of the reentry restrictions by the applicator.
2. A 100-foot buffer between occupied classrooms and a turf or ornamental pesticide application must be maintained during normal class hours or when persons are using the treatment area.
3. A pesticide applicator must notify the school's building manager of any reentry periods required by the labels of the pesticide used in the school building or to school property.

4. Schools must provide, within 30 days of the beginning of each school year, written notification to parents or guardians of children who attend the school of their right to be notified before any pesticide application is made to school property. Licensed day-care centers must provide similar notification in September of each year. The notification must include the following:

- A statement that pesticides are periodically applied to the school or day-care center property.
- A statement that parents and guardians have the right to request prior notification of pesticide applications to the building or grounds.
- Specific directions how a parent or guardian can be included on the list for prior notification, which shall include both of the following:
 - The name of a contact person at the school, including his/her telephone number, who is responsible for compiling the list.
 - A form that parents or guardians may return to the contact person to request inclusion on the prior notification list. (See appendix)
- A statement that pesticides may be applied in an emergency situation without prior notification to parents or guardians, but that parents or guardians will be notified of the application after it occurs.

IPM Program Training Requirements

I. Site Evaluation

Site evaluation is a vital step in establishing the condition of the facility as it relates to pest management. The following four basic elements required by law in a site evaluation are:

- Site description
- Site inspection
- Site monitoring
- Concept of threshold levels.

Site description - is a description of each building that helps to identify areas of current or potential pest problems. The description is updated periodically to reflect repairs, remodeling, and other site changes.

A site description should include:

- Building name and address
- Purpose or use of building
- History of pest problems
- Building layout and features such as: floor plan, number of floors, kitchen facilities, boiler rooms, overall conditions, neighboring property, etc.

Site Inspection - The IPM mandate in Michigan requires the applicator to first conduct an initial service inspection that can serve as the starting point for the IPM program. Inspect both the interior and exterior of the building for activity and conditions conducive to pests. Ongoing inspections (often monthly) allow you to detect newly-arrived pests and begin controlling them before they become a serious problem. The inspection should focus on vulnerable areas of the facility such as the kitchens, lounges, concession areas, cafeterias, custodian closets, pools and locker rooms, and rooms where food, water, and clutter are present.



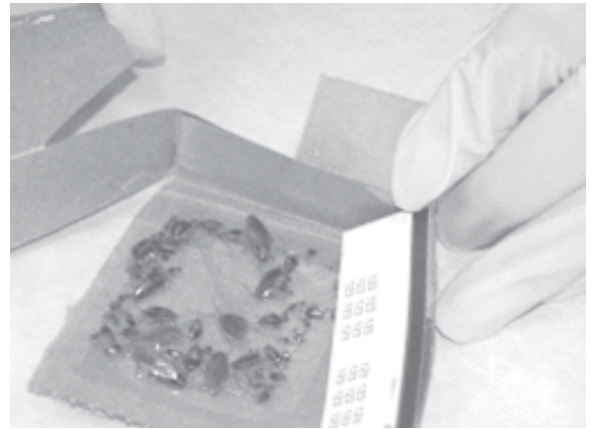
During inspections, ask facility occupants if they have seen pests or evidence of pests. Facility occupants can assist in the inspection by reporting and recording in the IPM logbook (see appendix) any pest activity.

Site Monitoring – is the process of watching for increases or decreases in pest activity. There are basically two methods used in monitoring for pest problems.

The **active method** involves regularly scheduled visual inspections that are usually time consuming. The inspection accuracy may depend on the education and experience of a pest control person.

The **passive method** includes monitoring practices that record pest related activity without an experienced pest monitor. A staff member of the facility who regularly checks the monitor stations usually employs this method. These monitoring techniques are complementary in an IPM program, with one providing information the other cannot. Monitoring is a documented, systematic inspection conducted at regular intervals.

Threshold Level- is a key component of site evaluation. Threshold level is the level of pest numbers that can be tolerated by the occupants. It varies depending on the site, pest, and occupants of the facility. The pest control operator must understand this concept and be able to communicate it to the facility manager. When a pest population exceeds the threshold level, actions should be taken to control the pests. Each facility may have a different action threshold level, which can change from facility to facility and even from month to month. Under the threshold level concept, the applicator should be able to decide when to take action and what method to be used or when to simply continue monitoring. Different levels of pests may generate a different IPM method.



Pest Biology Consideration and Pest Management Methods Choice

This is the most important factor in controlling pests. Determining pest biology or pest habits will guide the applicator in selecting the best pest management method. Proper pest identification is essential in determining the behavior and habitat of the pest. Without it, you cannot make an informed decision about how to best control the pest or if control is necessary. The choice for pest management can then be made based on the method that will most effectively make the habitat undesirable for the pest.

A review of pest biology should include the following conditions:

- (1) Routes of entry
- (2) Climate
- (3) Water sources
- (4) Food sources
- (5) Harborage areas

Pest Management Methods

The IPM methods are the heart of an IPM program. Pest control practices such trapping, caulking, power washing, and vacuuming are control measures that can be used with a high degree of safety. The pest control operator should focus on methods that will prevent pests over the long term, such as pest proofing or operational changes that improve sanitation. IPM methods encourage ongoing maintenance and housekeeping to insure that pests will not find a hospitable environment in the facility.

The IPM methods can be divided into two categories: the **population reduction method** and the **prevention method**. When used together, they will give a comprehensive approach to pest management for ultimate control.

A. Population Reduction Method includes mechanical, biological, and chemical control.

1. Mechanical control includes the use of traps, devices, and machines to control pests or alter their environment. Traps, screening, barriers, fences, and nets can be used to prevent the spread of pests from an area.
2. Biological control is a pest management method that reduces or mitigates pests and pest effects through natural enemies. Parasitoids, predators, and pathogens, combined with habitat management strategies have proven to be successful in suppressing some pests. Biological control, in general, is man's use of a specially chosen living organism to control a particular pest.
3. Chemical control uses naturally derived or synthetic chemicals called pesticides that kill, control, mitigate, attract, or otherwise interfere with the normal behavior of a pest. The pest control industry has expanded their pesticide application methods to deliver safer systems to the end users that will minimize exposure. Baits and gels have become a major tool in the war against roaches.

B. Pest Prevention Method includes two major practices: habitat modification and sanitation, and behavior modification.

1. Habitat modification and sanitation involves changing the environment of the pest so that they can not live or reproduce there. This practice helps to prevent and suppress some pests by removing the pests themselves or their shelter, food and water sources. Pests in facilities can be greatly reduced by improving cleanliness, eliminating pest hiding places, increasing the frequency of garbage pickup and pest proofing.
2. Behavior modification addresses the human habits that create conditions conducive to pest activity. This is the most difficult method to implement because it involves trying to change people's habits. A strong and aggressive educational program on human behavior that creates conditions conducive to pest activity is probably the only way to address this.

A behavior educational program could entail a simple bulletin or flyer addressing behaviors/practices that attract pests such as leaving open food out, not cleaning food spillage, or keeping a cluttered work area.

Impact of Pesticides on Human Health and the Environment

Pesticides may be used in IPM programs in Michigan. However, they should not be applied automatically without first considering alternative methods. Pesticides should be used in ways that minimize the risk to people, property, and the environment.

There are many factors to consider when choosing a pesticide for use in a facility. You want them to be effective while posing the least risk to the occupants. Three main characteristics should be considered in choosing pesticides:

A. Toxicity is the capacity of a chemical to cause illness or injury. The more toxic pesticides cause injuries at smaller doses and are therefore more hazardous to use. Signal words (danger, warning, and caution) are printed on every pesticide label to give you a relative measure of the toxicity of the pesticide concentrate or mix in the container.

Danger means highly toxic

Warning means moderately toxic

Caution means slightly toxic or relatively nontoxic

B. Volatility is the measure of how fast a pesticide vaporizes when exposed to the air. The lower the volatility, the less the pesticide vaporizes into the air after treatment. Information about a pesticide's volatility can be found on the Material Safety Data Sheet (MSDS).

C. Formulation is how a pesticide is expressed, whether as a wettable powder, dust, emulsifiable concentrate, aerosol, bait or other form. Type of formulation is very important to the issue of safety. For example, insecticide dust is a good choice for application into a wall void, but it would be a bad choice for an application into a drop ceiling where vibration might cause the dust to drift down on those below.

Program Evaluation

Program evaluation is a regular and periodic review of inspection reports, sanitation reports, logbook, application records, and other records to determine how the program is working, and identify any changes in pest activity (increase or decrease). The review should note the correlation between actions taken and changes in pest populations. The results should be compared with goals and objectives. The following is a list of quality assurance questions to consider in measuring success:

- Are all pest populations below action thresholds?
- Have all objectives been met?
- Is the monitoring program adequate?
- Should other action be taken?
- Can time and effort be reduced?
- What problems have been identified?
- What changes are necessary?

Recordkeeping

Recordkeeping is a vital and required component of an IPM program. Maintaining good records will help you solve pest problems and give you an historical perspective of pests. You can further anticipate seasonal pest problems and the IPM method(s) that will give the best control. It is recommended that all records be kept in a centralized location accessible to key members of the IPM team.



Michigan Regulation 636, Pesticide Applicators, Rule 15, requires all commercial applicators maintain the following records:

These records must be kept for at least three years for restricted use pesticide applications and at least one year for general use pesticide applications:

- The name, EPA registration number, and concentration of the pesticide applied
- The amount of the pesticide applied
- The target pest(s) or purpose
- The date the pesticide was applied
- The address or location of the pesticide application
- The method and rate of application

In addition, Regulation 637, Pesticide Use, Rule 14, requires the following recordkeeping information for pesticide applications made in schools, health care facilities, and public buildings:

- The site address
- The date of service
- The target pest or pests
- The inspection report to include:
 - The number of pests found
 - The conditions conducive to pest infestation
- The pest management recommendations
- The structural or habitat modifications initiated
- The name and quantity of pesticide(s) used
- The location where pesticides were applied
- The name of the applicator
- Where applicable, the name of the pest control firm and the emergency telephone number

Records in the IPM Plan

It is highly recommended that the IPM plan include the following:

- 1) Copy of service schedule
- 2) Copy of current labels and MSDS for pesticides used
- 3) Pest surveillance data sheets

These records must be made available upon request to an authorized representative of the MDA director during normal business hours.

It is necessary to have two-way communication between those conducting the IPM program and the users of the facility in order for IPM to work. Much of the communication will take place between the building manager (person who is responsible for the building's pest management program and to whom any reporting shall be made) and the pesticide technician directly.

Communication can take many forms: talking with staff members about pest sightings, discussing ways to reduce pests by improving housekeeping or making repairs, and soliciting staff cooperation. Another way to get cooperation is by explaining to the users of the facility how IPM enhances and complements regular pest control service.

Communication educates the facility users and other interested parties about potential pest problems, their causes, and the IPM solution. Simply having informed individuals who will spot and report pest problems can go a long way toward managing pests.

The building manager and applicator must work together and obtain cooperation from the building's occupants to ensure the program's success. They should communicate to the occupants what their responsibilities are and how they (the occupants) can help.

Commercial applicator responsibilities:

- Submit copy of IPM program and initial service inspection record to the building manger
- Obtain acceptance from building manager that he/she will post required sign
- Provide to the building manager required recordkeeping information at the completion of each service

Building manager responsibilities:

- Accepting responsibility to post all required signs
- Assisting the commercial applicator with the implementation of the IPM program and plan

The IPM Communication Circle

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Common Pests

An IPM program consists of accurate identification of pests, which is a vital step to ensure that control methods will be effective. Once the pest has been identified and the source pinpointed, IPM techniques may greatly reduce the prevalence of the pests.

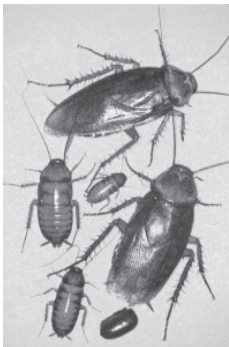
The following is an identification guide of some common pests found in Michigan.

German Cockroach – *Blattella germanica*

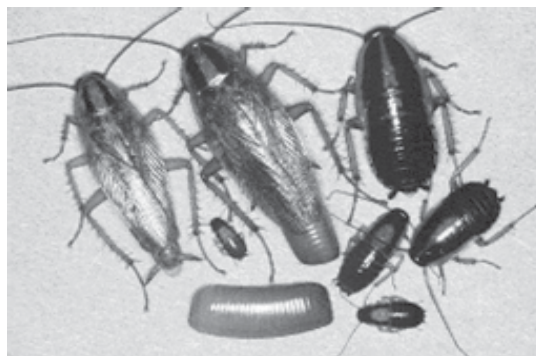
Appearance:	About five-eighths of an inch long, light to medium brown, with two dark longitudinal streaks on the thorax.
Habits:	Nocturnal; primarily infest areas close to food, moisture and warmth; most common roach found in and around apartments, homes, supermarkets and restaurants.
Diet:	Scavengers; eat almost anything.
Reproduction:	Females can produce 1 egg capsule every 20 to 25 days; each capsule contains from 18 to 48 eggs; newly born become adults in as little as 36 days; adults can live up to 1 year.
Other information:	Extremely heavy infestations are not uncommon; often found aboard ships; widest distribution of all roaches in United States.

Cockroach facts:

- Young cockroaches look like smaller versions of adult cockroaches without wings.
- The German, not the American cockroach, is the most troublesome domestic roach species in North America.
- Cockroaches live just about everywhere and eat almost anything. However, since they evolved as scavengers of dead plant material, they prefer carbohydrates to protein and fat.
- Cockroaches feed mainly at night and are scavengers that will eat almost anything. Some show a marked attraction to alcoholic beverages, particularly beer.
- Many humans are allergic to the dust created by cast-off cockroach skins, dead bodies, and droppings.
- Cockroaches can enter facilities through cracks and crevices but are often brought in with shipped material, groceries, soft-drink cases, used appliances, rugs, furniture, etc.
- Cockroach eggs are naturally protected from pesticides, making them difficult to control.



American Cockroach



German Cockroach



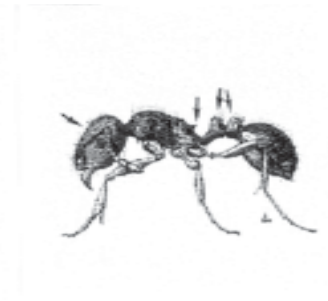
Brown Banded Cockroach

Pavement Ant – *Tetramorium caespitum*

- Appearance:** Light brown to black, appendages lighter than rest of the body; about one-tenth inch long; parallel lines on head and thorax; antennae of 12 segments.
- Habits:** Invade homes foraging for food throughout the year. Nests are outdoors under stones, along curbing or in cracks of pavement; can nest indoors in walls and under floors.
- Diet:** Omnivorous, will eat many things, but prefer greasy and sweet foods.
- Reproduction:** Queen produces 5 to 20 eggs per day; brood develops in about 40 days; young go through 3 larval states.
- Other information:** Slow-moving; a particular nuisance around homes with slab-on-grade construction.

Ant Facts:

- North American ant species come in a wide range of sizes and colors (black, brown, red, yellowish, and combinations of these).
- Ants communicate by touch and smell. They lay down chemical trails and constantly touch each other to pass on their nest odor.
- Ants are social insects and live in colonies that may have as many as 500,000 individuals.
- When ants find food, they lay down a chemical trail, called a pheromone, so other ants can find their way from the nest to the food source.



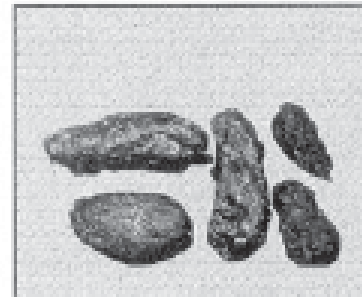
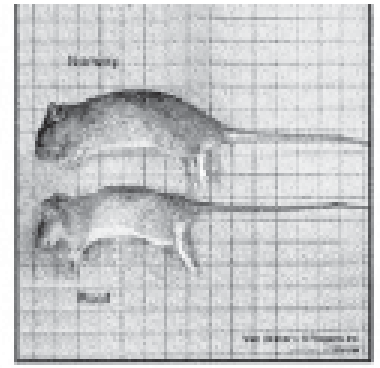
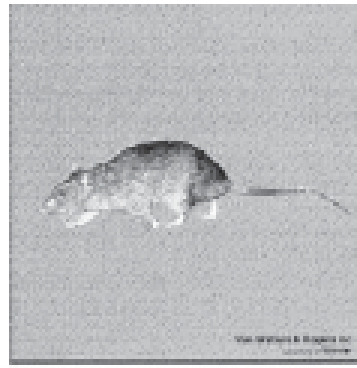
Norway Rat – *Rattus norvegicus*

- Appearance:** Brown, heavy-bodies, 6 to 8 inches long; small eyes and ears, blunt nose; tail is shorter than head and body; fur is shaggy; droppings are capsule-shaped.
- Diet:** Omnivorous, but prefer meats; cannot survive long without water.
- Reproduction:** Reaches sexual maturity in two months; can breed any month of the year; litter may number from 8 to 12; females can have 4 to 7 litters per year; adults live as long as 1 year.
- Other information:** Most common rat in United States; limited agility, but excellent swimmer; carrier of many serious diseases.

Rat Facts:

- Rats memorize specific pathways and use the same routes habitually.
- Rats can get into your home through a hole about the size of a quarter.
- Rats damage structures, chew wiring and cause electrical fires, eat and urinate on human and animal food, and carry many diseases.
- Thousands of rat bites are reported each year in the United States alone and many go unreported.
- Accidental poisonings occur among humans and pets from poorly planned efforts to poison rats.

- Within urban areas, rats derive their life supports from waste-management systems and food processing and storage areas.
- Rats rely predominantly on smell, taste, touch, and hearing as opposed to vision. They move around mainly in the dark, using their long, sensitive whiskers and the guard hairs on their body to guide them.
- Rats are cautious. If their food is in an exposed area where it cannot be consumed quickly, they usually carry or drag it to a hiding place.
- Rats have an excellent sense of taste, enabling them to quickly detect certain compounds, including rat poisons, at extremely low concentrations.
- Rats are omnivorous, eating nearly any type of food, including dead and dying members of their own species.

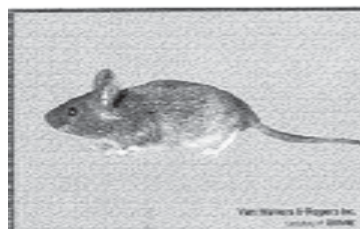


House Mouse – *Mus musculus*

Appearance:	Small and slender, 3 to 4 inches long, with large ears, small eyes and pointed nose; light brown or light gray rod-shaped droppings
Habits:	Nests within structures and burrows; establishes a “territory” near food sources generally 10 to 30 feet from nest; inquisitive, but very wary; excellent climber.
Diet:	Omnivorous, prefers cereal grains.
Reproduction:	Prolific breeders at 2 months; can have litters as often as every 40 or 50 days with 4 to 7 young per litter; live up to 1 year.
Other information:	Feeds 15 to 20 times per day; can squeeze through a hole 1/4 inch wide; carries many serious diseases.

Mouse Facts:

- The word “mouse” can be traced to the Sanskrit word “musha” which is derived from a word “to steal”.
- Of all the mouse species that invade human structures, only the house mouse usually becomes a long-term inhabitant if not controlled.
- Some scientists speculate that mice developed from rats under conditions where it was less important to be large and ferocious than to be able to get into a smaller hole.
- Mice are more acceptable to humans than rats, possibly because of what is known as the “Disney influence.”
- Mice are capable of being transported for long periods of time in closed containers such as boxes, trucks, or barrels.
- The house mouse is found throughout the world from the tropics to the Arctic regions.



- There are believed to be about 300 separate varieties of house mice in the United States.
- The house mouse has a protective mechanism that responds to environmental stress, excessive heat for example, by inducing a torpor or dormancy that conserves its physiological reserves.
- Many fires of “unknown cause” may have been caused by mice chewing through electrical wires.
- In 6 months, 1 pair of mice can eat about 4 pounds of food and produce some 18,000 fecal droppings.
- Mice feeding on colored crayons will produce droppings based on the color of the crayon they were feeding on.
- Mice are not blind but have bad vision and cannot see clearly beyond about 6 inches.

House Fly – *Musca domestica*

Houseflies are the most common flies found in and around structures. They are found throughout the United States and the world. Not only are these flies a nuisance, they are important disease carriers. They have the capability of harboring over 100 different disease organisms including typhoid fever, cholera, diarrhea, and polio; along with parasitic worms. Disease is spread by the feeding habits as flies constantly excrete and regurgitate on food sources.

Adults are dull gray, 1/8” – 1/4” long, thorax with 4 narrow black longitudinal stripes on the top. Females lay single eggs but usually in clusters of 20 to 50 for a total of 75 to 150 per batch and will lay 5 to 6 batches during their lifetime. Eggs are laid in moist substances and hatch in 8 to 20 hours. Adults emerge in 3 days to 4 weeks depending upon temperature and humidity. Houseflies are attracted to many different food sources ranging from excrement to human foods.

Control is a 6-step process including identification, inspection, communication, sanitation, mechanical control, and proper insecticide application.



Management of Pests

All pests found in your facility must be properly identified to ensure adequate control. Each pest must be described. There are four major questions to consider in controlling pests:

1. What do they eat?
2. Where do they hide?
3. How did they enter the building?
4. What damage did they/could they cause?

For example: The fruit fly is attracted to human and animal excrement and will feed on fermenting liquids or decaying fruits. The fruit fly breeds in ripened fruits and vegetables and moist, decaying, organic matter.

Establishing an IPM Program

An efficient IPM program should be integrated with existing facility management programs such as janitorial practices, lawn care and facility maintenance. The following steps are an example of how an IPM program can be developed:

1. Develop an official IPM policy statement. This useful first step in making the transition from a conventional pesticide program to an IPM program goes beyond simply stating a commitment to support and implement an IPM approach. It acts as a guide for the pest manager to use in developing a specific IPM program.
2. Designate pest management roles for occupants, pest-management personnel, and key decision-makers, and assure good communication among them. Educate and train people for their respective roles.
3. Set pest management objectives for the site(s). For every site, pest management objectives will differ. The type of pest management should be outlined.
4. Inspect site(s) and identify and monitor pest populations for potential problems.
5. Set action thresholds. These are the levels of pest populations or site environmental conditions that require remedial action.
6. Apply IPM strategies to control pests. These include redesigning and repairing structures, improving sanitation, using traps and applying pesticides only when needed.
7. Evaluate results to determine if pest management objectives are reached and keep written records of all aspects of the program.

How to Write Your IPM Program

The following is an outline that is intended to assist you in writing your IPM program.

Recommended Components

Introduction

The introduction should include background information on the facility and a brief history of pest problems. The concept of IPM should also be explained with a strong focus on the variety of pest management options available.

Policy Statement

A policy statement should state the intent of the facility administration to implement an IPM program. It should provide guidance on what specially is expected. The following is an example of a policy statement:

(Name of your facility) recognizes that structural and landscape pests can pose significant problems to students/staff, school facilities, and the environment. Also recognized are the hazards pesticides pose to the health and safety of all people. It is therefore the policy of (your facility) to incorporate IPM procedures for control of structural and landscape pests. These procedures will be in compliance with Michigan Regulation 636, Pesticide Applicators and Regulation 637, Pesticide Use.

Definition Section

IPM, pest, pesticide, RTU, building manager, mechanical control, biological control, chemical control, habitat modification, structural modification, and behavioral modification are specialized words use in pest management that should be explained. It is important that all parties involved in the IPM program agree on basic principles and practices.

Responsibility Section

Designating pest management roles of all parties involved is key to the success of the IPM program. When the respective roles of all the parties involved are identified and agreed upon, when parties communicate well with each other, and meet their special responsibilities, success is sure to follow. For example:

- The building manager is responsible for the building's pest management program. Any reporting and notification shall be made to the building manager.
- One of the roles of the pest control operator or pesticide applicator will be to observe and evaluate the site and decide what needs to be done to achieve the site's pest management objectives. He/she will perform the necessary pest management actions or recommend to the building manager changes that need to be made by the facility.
- The most important responsibility of the staff is sanitation and monitoring. Much of the prevention and reduction of pest infestation at the site depends on whether or not proper maintenance is performed.

Required Components

Site evaluation

Site evaluation includes the following three components:

1. Site description: (Insert map or descriptive narrative of facility here)
2. Site monitoring section: (include monitoring methods and tools)
3. Site inspection section: (include list of inspection tools and where and how to inspect)

Consideration of the relationship between pest biology and pest management methods

Relationship of pest biology and pest management methods: (includes pest biology and habits and a discussion on the pest management methods that addresses the pest biology and habits.

For example: Consideration of the relationship between pest biology and pest management methods, i.e., large cockroaches may wander along pipes throughout a building, but in temperate climates they live mainly at ground level or below. Pest management method used should focus on warm, moist areas such as basements, boiler rooms, etc. The most effective way to control large cockroaches is to reduce moisture by fixing leaks, improve drainage, maintain proper floor drains, i.e. screening, trap level maintenance, organic debris removal, and installation of screened vents to increase airflow.

Consideration of all available pest management methods

Include a discussion of all available IPM techniques to control pests such as:

1. Reduction techniques: achieved by using a combination of the followings: mechanical, biological, and chemical if warranted.
2. Prevention techniques: achieved by pest habitat modification or elimination, i.e. caulking of cracks in walls and floors, and modifying cleaning and storage practices using different cleaning agents.

Pest control method selection

Pest management method(s) selection: should include the impact on human health and the environment.

Continual evaluation of the IPM program

Continually evaluate the IPM program to determine:

1. Program effectiveness.
2. Need for program modifications.

All components of this plan are to be evaluated periodically as determined by your facility's building manger and the pesticide applicator.

Management of Pests

All pests found in your facility must be properly identified to ensure adequate control. Each pest must be described. There are four major questions to consider in controlling pests:

1. What do they eat?
2. Where do they hide?
3. How did they enter the building?
4. What damage did they/could they cause?

For example: The fruit fly is attracted to human and animal excrement and will feed on fermenting liquids or decaying fruits. The fruit fly breeds in ripened fruits and vegetables and moist, decaying, organic matter. Because it breeds in unsanitary areas, it could potentially carry disease-causing bacteria into food products.

Non-chemical control

Any place where food is routinely prepared, dispensed, and consumed should be kept sanitary to prevent them from eating and breeding. Any area where water and organic material accumulate is a potential breeding site, i.e. wet mop heads, piles of dirty wet rags, used mopping water.

Chemical control

If a chemical method is chosen, it must include:

- The chemical's impact on human health and the environment.
- Best time to control pest depending on method chosen
- Rooms should be unoccupied during treatment

Mice Pest Behavior

Mice may enter buildings from the outside, but many mouse problems originate indoors. Although large numbers can build up in food service areas or trash rooms, small numbers can survive practically anywhere. Mice generally nest within 15-30 feet of their food source and frequently spread through a structure along pipes, cables, and dusts. The increased use of raised flooring for electric, telecommunications and computer cables in and facilities has greatly increased potential mouse harborage in public and commercial buildings.

Methods of Control for Mice

Habitat Modification

Mice can squeeze through cracks just wider than one-quarter inch (the size of a dime). Entry points can be sealed with caulk or cooper mesh

All food and refuse should be stored in sealed containers. Surfaces, crevices and containers should be free of food residue. Strict attention to cleanliness is essential for mouse control in food service areas.

Mechanical Control

Traps, if used correctly, are very effective in controlling mice. They must be set in the right places, in high numbers and in the right position or mice will miss them entirely.

Glue boards and snap traps are usually the most effective devices for controlling small numbers of mice. Windup multiple catch traps can be useful for controlling large infestations in kitchens or unoccupied spaces, provided the necessary sanitation and sealing measures are also carried out.

Chemical Control

Integrated Pest Management

Pest Sighting Log



Facility: _____

To Be Completed by
Facility Official

To Be Filled Out by
Pest Manager

[illegible]

Pest Reporting Form

Name:

Date:

Time:

Pest:

Where was the pest seen?

Room:

Location in the Room:



Pest Reporting Form

Name:

Date:

Time:

Pest:

Where was the pest seen?

Room:

Location in the Room:



Pest Reporting Form

Name:

Date:

Time:

Pest:

Where was the pest seen?

Room:

Location in the Room:



Pest Reporting Form

Name:

Date:

Time:

Pest:

Where was the pest seen?

Room:

Location in the Room:



Integrated Pest Management Pest Monitoring Stations



School or Facility: _____

Today's Date _____ Technician _____

Trap	Location	Data
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
19		
20		
21		
22		

Integrated Pest Management Monitoring Station Report

Record the number and type of pest found in each monitoring station.
Mark new insects so they are not counted in the next inspection.



A = Ant,
C = Cockroach,
R = Rat,
M = Mouse,
X = Nothing found in the monitoring station

Date Trap Location

January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		

Integrated Pest Management Sample Map

Illustrating the Location
of Monitoring Mtations



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Integrated Pest Management

Pest Management Action and Follow Up



Problem was Discovered:

[illegible]

Integrated Pest Management Pesticide Recordkeeping Form



Location and Inspection Information

Location:

Date:

Pests Noted:

Conditions Conducive to Pest Infestation:

Pest Management Recommendations Made by the Applicator:

Structural or Habitat Modifications Undertaken:

Application Information

Name of Pest Control Firm (If Employed) and Emergency Phone Number:

Target Pest(s)

of Target Pests Found or Reported:

Name of Applicator:

Applicator Certification #:

Name of Pesticide(s) (Brand or product name):

EPA Reg #(s):

Active Ingredient(s):

Concentration of Pesticide(s) Applied:

Quantity of Pesticide(s) Used:

Method and Rate of Application (where applicable):

Restricted Entry Interval:

Location Where Pesticide(s) Applied [Written description or map]:

Notes:

Integrated Pest Management Sample Pesticide Recordkeeping Form



Inspection Information

Date of Service

Site Address

Number of Pests Found or Reported

Conditions Conducive to Pest Infestation

Pest Management Recommendations Made by Applicator

Structural or Habitat Modifications

Name of Pest Control Firm (if Employed) and the Emergency Phone Number

Application Information

Name of the Applicator

Target Pest or Pests

Name of Pesticide(s) (Brand or Product Name)

Quantity of Pesticide Used

Location Where Pesticide Was Applied (Written Description or Map)

Integrated Pest Management Recordkeeping Form



Site Address:

Target Pest or Purpose:

Name of Pesticide Applied:

Concentration of Solution (oz/gal):

Amount Applied:

Method of Application:

Rate of Application:

Location in Building Where Applied:

Number of Pests Found:

Reasons for Infestation:

Other Control Measures Implemented/Recommended:

Name of Applicator

Date

Name of Pest Control Firm

Integrated Pest Management Record for Commercial Firms



Company Name: _____

Address _____

Phone Number _____ Fax _____

City _____ State _____ Zip _____

E-Mail _____

Site Address: _____

Target Pest or Purpose: _____

Name of Pesticide Applied (common name of the active ingredient): _____

Concentration of Solution (oz/gal): _____ Amount Applied: _____

Method of Application: _____ Rate of Application: _____

Location in Building Where Applied: _____

Number of Pests Found: _____

Reasons for Infestation: _____

Other Control Measures Implemented/Recommended: _____

Precautionary Warnings: _____

Name of Applicator

Date

Name of Pest Control Firm

Pesticide Use Log

Facility: _____

A = Ants
C = Cockroaches
R = Rats
M = Mice



Application

[illegible]

Integrated Pest Management Pesticide Applicators

[illegible]

Verification of Training



INSTRUCTIONS: This form is to be completed by the pesticide applicator's immediate supervisor and must be returned to the Michigan Department of Agriculture. Individuals who are self-employed and do not have an immediate supervisor may indicate so by checking the box below.

☐ **Self Employed** - Check here. List company information and sign below.

Company name: _____

Address _____

City _____ State _____ Zip _____

Phone _____

I _____, employed by _____

(Print name of supervisor)

(Print name of employer)

certify that _____ has completed the MDA,

(Print name of applicator)

PPPM self study training manual on Integrated Pest Management.

This training was completed on _____ and included a review of all chapter

(Date)

information and completion of self study questions.

Signature of Applicator

Date

Signature of Immediate Supervisor

Date

Advisory to Parents



Dear Parent or Guardian:

The _____ school/day-car center utilizes an Integrated Pest Management (IPM) approach to control pests. IPM is a pest management system that utilizes all suitable techniques in a total pest management system with the intent of preventing pests from reaching unacceptable levels or to reduce an existing population to an acceptable level. Pest management techniques emphasize pest exclusion and biological controls. However, as with most pest control programs, chemical controls may also be utilized.

You have the right to be informed prior to any application of an insecticide, fungicide, or herbicide made to the school grounds or buildings during this school year. In certain emergencies, such as an infestation of stinging insects, pesticides may be applied without prior notice to prevent injury to students, but you will be notified following any such application. If you need prior notification, please complete the information below and submit it to:

(Enter school name, address, contact person, and phone number here)

School: _____
Address: _____
City: _____ State: _____ Zip: _____
Contact person: _____ Phone: _____

Prior Notification Request

Parent Name: _____
Student Name: _____
Street Address: _____
City, _____ Zip: _____
Day Phone #: _____ Evening Phone #: _____

Please check one:

I wish to be notified prior to a scheduled pesticide application inside the school building.

I wish to be notified prior to a scheduled pesticide application on the outside grounds of the school building.

Both of the above.

Signature _____ Date _____

IPM Resources / References / Web Sites

MDA does not endorse or recommend any particular site or reference. This list is provided for reference only.

Daar et al., 1997. Appendix B. How to develop an IPM program. Pp. 159-167. In IPM for Schools: A How-to Manual. Available at www.epa.gov/region09/toxic/pest/school/index.html

Koehler, et al., 1999. School IPM Web Site. University of Florida. The national Web site for IPM in schools, including basic education, links to web sites for state-specific resources, pest control, pesticides and health. Available at schoolipm.ifas.ufl.edu/

Stier et al., 1999. Section 1: Essential Elements of IPM. In Wisconsin's School Integrated Pest Management Manual. Available at ipcm.wisc.edu/programs/school/default.htm

U. S. Environmental Protection Agency. Integrated Pest Management in Schools. Links to state and region-specific school IPM Web sites throughout the U.S.; state government, University and Extension contacts for school IPM by state. Available at www.epa.gov/pesticides/ipm/

California School IPM. Overview of IPM, Managing pests, Health and the environment, Model programs. Available at cdpr.ca.gov/cfdocs/apps/schoolipm/main.cfm

Integrated Pest Management in Schools. IPM Training Manual. Maryland Department of Agriculture.

Handbook of Pest Control. 1997 Mallis, A. Mallis Handbook and Technical Training Company. 8TH ED. 1455 pp. Pest ID, pest biology and control measures for most common pests. Check your local library.

Complete Guide to Pest Control With or Without Chemicals. George W. Ware. Check your local library.

NPCA Field Guide to Structural Pests. National Pest Control Association 800 page reference on nearly 200 different structural pests. Available at www.pestworld.org/store/default.asp

EPA – An interactive guide to reading a pesticide label. Available at www.epa.gov/pesticides/label/read.htm

IPM Institute. IPM standards, certification and labeling for agricultural and community IPM. Available at www.ipminstitute.org

National Pesticide Information Center. *Toll-free telephone service (1-800-858-7378). Provides pesticide information, fact sheets on pesticides and anti-microbials.* Labels, MSDS, Poison Control Centers, Manufacturers, Spill contacts. Available at npic.orst.edu/

Stauffer *et al.*, 1998. Safety precautions and personal protection for the applicator and worker. Pp. 6-1 to 6-16. In IPM Workbook for New York State Schools. *Protective equipment and clothing for pesticide applicators; pesticide transport, handling, storage, application and cleanup safety.* Available at www.nysipm.cornell.edu/publications/schoolwkbk.pdf

Michigan Regulation No. 637 Rule 14 Integrated Pest Management. Available at www.state.mi.us/orr/admincode. At this site select Dept. Index, Agriculture, Pesticide and Plant Pest Management, Regulation 637. IPM is covered in Rule 14.

Review Questions



1. What is Integrated Pest Management?
2. Recordkeeping must include:
3. Who need to be certified in Michigan to apply pesticides?
4. Before any pesticide application is made in a public building, school, or health care facility, 2 things must take place:
5. The four basic elements required under site evaluation are:
6. The IPM mandate in Michigan requires the commercial applicator to give to the building manager a copy of _____ and _____ before making a pesticide application in regulated facilities.
7. IPM takes advantage of the following tragedies:
8. The population reduction method includes what three pest control strategies?
9. The pest prevention method includes what two pest control strategies?
10. Define biological control and how it can reduce pest populations:
11. Define habitat modification where pest populations are too high:
12. Provide an example of behavior modification:
13. Pesticides should be used in ways to:
Larry, not sure what you're after here
14. The toxicity of a pesticide is the capacity of a chemical to cause:
15. The purpose of program evaluation is to:
16. Building manager responsibilities include:
17. Commercial pesticide applicator responsibilities include:
18. Communication is the process of exchanging information for the purpose of ensuring that all parties involved:

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